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Appl. No. 10/563,929
Response to Office Action of September 21, 2007

DEC 21 2007

PATENT
Docket No.: NL030816US1
Customer No. 000024737

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of scaling a three-dimensional input model (200-208) into a scaled three-dimensional output model (210-224), the method comprising:
 - determining for portions of the three-dimensional input model (200-208) respective probabilities that the corresponding portions of the scaled three-dimensional output model (210-224) are visible in a two-dimensional view of the scaled three-dimensional output model, the determining (a) being based on a projection of multiple projections of the three-dimensional input model (200-208) in a viewing direction and (b) being based on a viewing angle and depth-range capability of a display device, further wherein determining respective probabilities that the corresponding portions are visible includes assigning to elements stored in a z-buffer stack a designation of (i) type I for a portion that definitely will be visible in one of the projections, (ii) type II for a portion that most probably will be visible in one of the projections, (iii) type III for a portion that most probably will not be visible in one of the projections, and (iv) type IV for a portion that definitely will not be visible in one of the projections; and
 - geometrically transforming portions of the three-dimensional input model into the respective portions of the scaled three-dimensional output model on basis of the respective probabilities, wherein geometrically transforming of the portions comprise one of clipping, translation, rotation, or deformation, wherein no depth-range of the display device is wasted in the scaling for eventually invisible portions of the scaled three-dimensional output model.
2. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 1, whereby determining the probability that the first one of the portions is visible,

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is based on comparing a first value of a first coordinate of the first one of the portions with a second value of the first coordinate of a second one of the portions.

3. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 2, whereby determining the probability that a first one of the portions is visible, is based on capabilities of a display device (100) on which the three-dimensional scaled output model (210-224) will be displayed.

4. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 3, whereby the capabilities of the display device (100) correspond to a maximum viewing angle and a depth-range of the display device (100).

5. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 1, whereby the geometrically transforming the portions of the three-dimensional input model into the respective portions of the scaled three-dimensional output model on basis of the respective probabilities comprise one of translation, rotation or deformation.

6. (Original) A method of scaling a three-dimensional input model (1-8) as claimed in claim 1, comprising:

- computing the projection (302) of the three-dimensional input model (1-8) by means of a z-buffer stack (300);
- indicating which of the z-buffer stack elements are visible in the projection by means of comparing z-values of pairs of z-buffer stack elements having mutually equal x-values and mutually equal y-values;
- determining which groups of z-buffer stack elements form the respective portions of the three-dimensional input model (1-8), by means of segmentation of the z-buffer stack elements; and

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- indicating the probability of visibility of each z-buffer stack element which is part of a group of z-buffer stack elements comprising a further z-buffer stack element which is visible.

7. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 6, further comprising

- determining for each array of z-buffer stack elements having mutually equal x-values and mutually equal y-values a corresponding minimum z-value and maximum z-value; and

- computing scaled z-values for the z-buffer stack elements on basis of the respective minimum z-values and maximum z-values and the depth-range of the display device (100).

8. (Original) A method of scaling a three-dimensional input model (200-208) as claimed in claim 7, whereby determining minimum z-values is based on a morphologic operation.

9. (Currently Amended) A scaling unit (400) for scaling a three-dimensional input model (200-208) into a three-dimensional scaled output model (210-224), the scaling unit (400) comprising:

- probability determining means (402) for determining for portions of the three-dimensional input model (200-208) respective probabilities that the corresponding portions of the scaled three-dimensional output model (210-224) are visible in a two-dimensional view of the scaled three-dimensional output model, the determining (a) being based on a projection of multiple projections of the three-dimensional input model (200-208) in a viewing direction and (b) being based on a viewing angle and depth-range capability of a display device, further wherein determining respective probabilities that the corresponding portions are visible includes assigning to elements stored in a z-

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buffer stack a designation of (i) type I for a portion that definitely will be visible in one of the projections, (ii) type II for a portion that most probably will be visible in one of the projections, (iii) type III for a portion that most probably will not be visible in one of the projections, and (iv) type IV for a portion that definitely will not be visible in one of the projections; and

- transforming means (408) for geometrically transforming portions of the three-dimensional input model into the respective portions of the scaled three-dimensional output model on basis of the respective probabilities, wherein geometrically transforming of the portions comprise one of clipping, translation, rotation, or deformation, wherein no depth-range of the display device is wasted in the scaling for eventually invisible portions of the scaled three-dimensional output model.

10. (Original) An image display apparatus (700) comprising:

- receiving means (702) for receiving a signal representing a three-dimensional input model (200-208);
- a scaling unit (400) for scaling the three-dimensional input model (200-208) into a scaled three-dimensional output model (210-224), as claimed in claim 9; and
- display means (100) for visualizing a view of the scaled three-dimensional output model (210-224).